

REMARKS

Claims 1-8 are pending in this application. Claims 1, 3, 4, and 5 are amended herein. Support for the amendments to the claims may be found in the claims as originally filed. Reconsideration is requested based on the foregoing amendment and the following remarks.

Response to Arguments:

The Applicants appreciate the consideration given to their arguments. The Applicants, however, are disappointed that their arguments were not found to be persuasive. Further reconsideration is requested.

Objections to the Drawings:

The drawings were objected to for not showing "said information being evacuated outside said computer." Claims 1, 3, 4, and 5 have been amended to recite "being evacuated to a portion of said memory that corresponds to the first program" instead of "being evacuated outside said computer." Withdrawal of the objections to the drawings is earnestly solicited.

Claim Rejections - 35 U.S.C. § 112:

Claims 1, 3, 4, and 5 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Claims 1, 3, 4, and 5 have been amended to recite "being evacuated to a portion of said memory that corresponds to the first program" instead of "being evacuated outside said computer," as discussed above. Withdrawal of the rejection is earnestly solicited.

Claims 1, 3, 4, and 5 were rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which is not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 1, 3, 4, and 5 have been amended to recite, "a plurality of programs" instead of "a plurality of programs that are not limited in number by a total hardware resource of said computer." Withdrawal of the rejection is earnestly solicited.

Claim Rejections - 35 U.S.C. § 102:

Claims 6 and 7 were rejected under 35 U.S.C. § 102(e) as anticipated by US Patent No. 6,298,431 to Gottlieb (hereinafter "Gottlieb"). The rejection is traversed.

The second clause of claim 6 recites,

A hardware resource being used in parallel by at least two of a plurality of programs.

Gottlieb neither teaches, discloses, nor suggests, "a hardware resource being used in *parallel* by at least two of a plurality of programs," as recited in claim 6, with emphasis added. Gottlieb, rather, is about minimizing thread *switch* overhead. In particular, as described at column 1, lines 5-10:

The present invention relates generally to the field of microprocessors, and, more particularly, to a banked shadowed register file for minimizing thread switch overhead in multithreaded processing applications so as to improve processor performance.

Since Gottlieb is switching *between* threads, only one thread will ever be using the processor at any given time, rather than "being used in parallel by at least two of a plurality of programs," as recited in claim 6.

Furthermore, in Gottlieb, only *one* thread is supported at a time, and before another thread can begin, the current thread's state must be saved in memory. In particular, as described at column 2, lines 8-16:

As such, conventional processors are best suited for course grained multithreading since this type of multithreading requires supporting only one thread at a time. However, before another thread can begin, the current thread's state must be saved in memory so it can properly resume later. This process, referred to as a "thread switch," involves flushing the pipeline of instructions from the current thread, saving the thread's architectural state, and providing instructions from the new thread to the processor.

Since, in Gottlieb, only one thread is supported at a time, Gottlieb shows no "hardware resource being used in parallel by at least two of a plurality of programs," as recited in claim 6.

Finally, Gottlieb reassigns the processor's execution resources to a *new* thread when a currently executing thread stalls waiting for dependent operations. In particular, as described at column 3, lines 48-55:

Multithreading seeks to accomplish this by reassigning the processor's execution resources to a new thread when a currently executing thread stalls waiting for dependent operations. As noted above, this thread switch process requires the discrete steps of flushing the pipeline of instructions from the current thread, saving the current thread's architectural state, and providing instructions from the new thread to the execution core.

Since Gottlieb reassigns the processor's execution resources to a new thread when a currently executing thread stalls waiting for dependent operations, Gottlieb shows no "hardware resource

being used in parallel by at least two of a plurality of programs," as recited in claim 6. Claim 6 is submitted to be allowable. Withdrawal of the rejection of claim 6 is earnestly solicited.

Claim 7:

The second clause of claim 7 recites,

Said plurality of areas being used to run at least two of a plurality of programs in parallel.

Gottlieb neither teaches, discloses, nor suggests, "said plurality of areas being used to run at least two of a plurality of programs in parallel" as discussed above with respect to the rejection of claim 6. Claim 7 is submitted to be allowable, for at least those reasons discussed above with respect to the rejection of claim 6. Withdrawal of the rejection of claim 7 is earnestly solicited.

Claim Rejections - 35 U.S.C. § 103:

Claims 1-5 and 8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Gottlieb in view of Jim Handy's The Cache Memory Book © 1993 (hereinafter "Handy"). The rejection is traversed to the extent it would apply to the claims as amended.

In the claimed invention, the memory from which instructions are fetched refers to a memory that is outside a CPU and that is different than the registers inside the CPU. The information is consequently being evacuated to a portion of the memory, i.e. outside the CPU. Claims 1-5, in particular, recite:

Said information being evacuated to a portion of said memory that corresponds to the first program.

Gottlieb neither teaches, discloses, nor suggests, "said information being evacuated to a portion of said memory that corresponds to the first program," as recited in claims 1-5. Handy does not either, and thus cannot compensate for this deficiency of Gottlieb with respect to claims 1-5. Thus, even if Handy and Gottlieb were combined, the claimed invention would not result.

The Office Action acknowledges graciously in section 17 at page 7 that Gottlieb has not taught information being evacuated outside a computer. The Office Action seeks to compensate for this deficiency of Gottlieb by combining Gottlieb with Handy, saying in section 17 at page 7:

A person of ordinary skill in the art at the time the invention was made, and as taught by Handy, copying data from local memory, in Handy's case a cache, to main memory only when needed, e.g. when local memory is full, reduces the amounts of time the main memory is accessed, thereby reducing the amount of time the main memory bus is and processor speed is increased (Handy page 63,

paragraph 1). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the copying method of Handy in the device of Gottlieb to increase processor speed.

An intended purpose of Gottlieb, however, is to switch between multiple threads *without* accessing the memory system 22, which includes caches 24, 26, and 28 as well as the main memory 14). In particular, as described at column 5, lines 42-61:

The banked shadowed register file 30 of the present invention thus provides the ability to quickly and efficiently switch between multiple threads without accessing the memory system 22. By reducing the need for accessing the memory system 22, the banked shadowed register file 30 significantly increases the speed at which the current thread's architectural state can be saved, as well as the speed at which instructions from the new thread can be placed in the standard register file 18 for access by the execution core 16.

Modifying Gottlieb as proposed in the Office Action, on the other hand, would render Gottlieb unsuitable for this intended purpose, since, according to Handy, multiple threads will be switched by evacuating the threads *to* the main memory.

Modifications that render a reference, such as Gottlieb, unsuitable for this intended purpose are prohibited under the provisions of M.P.E.P. § 2143.01. In particular, as provided in M.P.E.P. § 2143.01, "If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)." Since, therefore, modifying Gottlieb as proposed in the Office Action would render Gottlieb unsuitable for this intended purpose, there is no suggestion or motivation to make the proposed modification.

Furthermore, modifying Gottlieb as proposed in the Office Action would also change the principal of operation of Gottlieb, since, as discussed above, Gottlieb operates by switching between multiple threads *without* accessing the memory system 22 while, according to Handy, multiple threads will be switched by evacuating the threads *to* the main memory.

Modifications that change the principal of operation a reference, such as Gottlieb, are also prohibited under the provisions of M.P.E.P. § 2143.01. In particular, as provided in M.P.E.P. § 2143.01, "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)." Since, therefore, modifying Gottlieb as proposed in the Office Action would change the principal of operation of Gottlieb, the teachings of the references are

not sufficient to render the claims prima facie obvious.

Claim 8:

Claim 8 recites,

The information is located in a first area of a processor and is evacuated to outside the processor when the area is necessary for execution of a second program.

Gottlieb neither teaches, discloses, nor suggests, "evacuated to outside the processor," as recited in claim 8. The Office Action seeks to compensate for this deficiency of Gottlieb by combining Gottlieb with Handy. Modifying Gottlieb as proposed in the Office Action, however, would render Gottlieb unsuitable for this intended purpose, as discussed above with respect to the rejections of claim 1-5, and there is consequently no suggestion or motivation to make the proposed modification.

Furthermore, modifying Gottlieb as proposed in the Office Action would also change the principal of operation of Gottlieb, as also discussed above with respect to the rejections of claim 1-5, and consequently the teachings of the references are not sufficient to render the claims prima facie obvious.

Finally, even if the references were combined, the combination would still not amount to "information is located in a first area of a processor and is evacuated to outside the processor when the area is necessary for execution of a second program," because Handy does not do that, either. In Handy, rather, information is being written to memory from cache, not from any execution area of the processor, as described at page 63, lines 18-22, 25, and 26.

Since, in Handy, information is being written from cache to memory, Handy shows no "information is located in a first area of a processor and is evacuated to outside the processor when the area is necessary for execution of a second program," as recited in claim 8. Thus, even if Gottlieb and Handy were combined, as proposed in the Office Action, claim 8 would not result. Claim 8 is submitted to be allowable, for at least those reasons discussed above with respect to the rejections of claim 1-5. Withdrawal of the rejection of claim 8 is earnestly solicited.

Conclusion:

Accordingly, in view of the reasons given above, it is submitted that all of claims 1-8 are allowable over the cited references. Allowance of all claims 1-8 and of this entire application is therefore respectfully requested.

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If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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